CLAIMS

What is Claimed is:

A method for calibrating a near infrared (NIR)

measurement device to a subject, said method comprising

the steps of:

forming a data set comprising a plurality of data terms for said NIR measurement device; augmenting said data set by forming cross-products terms using said data terms;

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forming a plurality of subsets having a first specified number of members randomly selected from said data set;

evaluating each of said plurality of subsets against a set of reliable measurement results for said subject;

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- selecting one of said subsets based on a preselected set of criteria; and
- using said selected set to form an optimal calibration for said device to said subject.

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2. The method of claim 1 wherein the step of forming cross-products further comprises forming second and third order terms.

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The method of claim 1 wherein the step of forming a plurality of subsets sets further comprises the forming of subsets sets having at least one alternative specified number of members, said alternative number(s) unequal to said first number.

- 4. The method of claim 3 wherein the step of selecting one of said subsets further comprises a comparison of the subsets having said first number of members with the subsets having said alternative number(s) of members.
- 5. The method of claim 1 wherein the step of selecting one of said subsets further comprises performing a cross validation study for at least one subset.
- 6. The method of claim 1, wherein said device measures blood glucose levels in said subject.
- 7. The method of claim 1 wherein said set of reliable
 20 measurement results for said subject are taken from more
 than one of said subject's fingers.

The method of claim 7 wherein said set of reliable measurement results is amended by duplicating, at least once, the measurement results taken from any one of said three fingers.

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9. The method of claim 1 wherein said set of reliable
measurement results is amended by duplicating, at least
once, at least one of the measurement results to produce
at least one alternative calibration.

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10. The method of claim 9 wherein said set of reliable measurement results are divided into at least one range of values.

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11. The method of claim 10 wherein said set of reliable measurement results is divided into a low range, a high range, and middle range.

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12. The method of claim 11 wherein each of said low, high and middle ranges is further divided into smaller ranges.

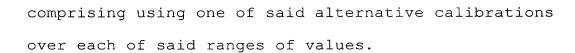
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blood glucose levels in said subject and wherein said set of reliable measurement results is divided into ranges below 120 mg/dL, greater than 240 mg/dL, and between 120 and 240 mg/dL.

The method of claim 11 wherein said device measures

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14. The method of claim 10 wherein the step of using said selected set to form an optimal calibration further



15. The method of claim 1 wherein said data set further comprises non-optical data terms.

6. A method for calibrating a non-invasive NIR blood glucose device measurement to a subject, said method comprising the steps of:

selected from said data set;

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forming a data set comprising a plurality of data terms for said NIR measurement device; augmenting said data set by forming cross-products terms using said data terms; forming a plurality of subsets having at least one specified number of members randomly

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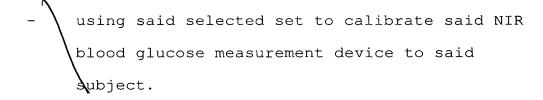
- evaluating each of said plurality of subsets against a set of reliable blood glucose measurements for said subject;

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- selecting one of said sets based on a preselected set of criteria, including the ability of the subset to predict said set of reliable blood glucose measurements for said subject; and

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- 5 17. A non-invasive device for measuring blood glucose levels in a subject, said device comprising:
 - means for gathering a plurality of data terms using NIR energy;
 - means for storing said plurality of data terms
 in a data set;
 - means for augmenting said data set with at least one cross-product term formed from said data terms and;
 - means for forming a plurality of subsets from said data set;
 - means for evaluating each of said plurality of subsets against reliable blood glucose level measurements for said subject; and
- means for selecting at least one of said subsets to calibrate said device to said subject.